

REPORT

DETERMINATION OF THE EXPLOSIVE PROPERTIES (LIQUIDS) OF



**NOTOX Project 338625
NOTOX Substance 111834/C**

CONFIDENTIALITY STATEMENT

This report contains the unpublished results of research sponsored by [REDACTED] [REDACTED]tted
without prior written authorisation from the sponsor.

STATEMENT OF GLP COMPLIANCE

NOTOX B.V., 's-Hertogenbosch, The Netherlands

The study described in this report has been correctly reported and was conducted in compliance with the most recent edition of:

The OECD Principles of Good Laboratory Practice

which are essentially in conformity with:

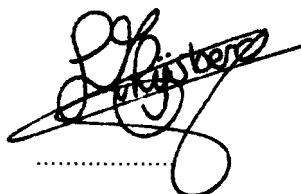
The United States Food and Drug Administration. Title 21 Code of Federal Regulations Part 58.

The United States Environmental Protection Agency (FIFRA). Title 40 Code of Federal Regulations Part 160.

The United States Environmental Protection Agency (TSCA). Title 40 Code of Federal Regulations Part 792.

Study Director

[Redacted Signature]

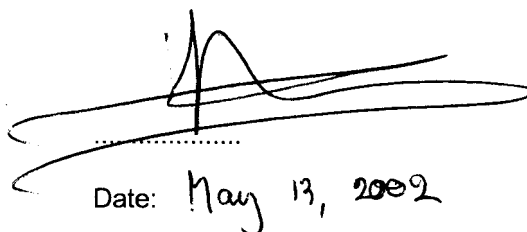


Date: May 03, 2002.

Management

[Redacted Signature]

Section Head Analytical & Physical Chemistry



Date: May 13, 2002

QUALITY ASSURANCE STATEMENT

NOTOX B.V., 's-Hertogenbosch, The Netherlands

This report was audited by the NOTOX Quality Assurance Unit to ensure that the methods and results accurately reflect the raw data.

The dates of Quality Assurance inspections and audits are given below.
During the on-site inspections procedures applicable to this type of study were inspected.

DATES OF QAU INSPECTIONS/AUDITS	REPORTING DATES
on-site inspection (s)	
18-Feb-2002 to 01-Mar-2002 (process)	04-Mar-2002
protocol inspection (s)	
13-Feb-2002 (study)	13-Feb-2002
report audit (s)	
18-Apr-2002 (study)	18-Apr-2002

Head of Quality Assurance



Date: 14-5-02

SUMMARY

The determination of the explosive properties of [REDACTED] was performed in accordance with EEC-Directive 92/69 EEC, A.14 "Explosive properties" (1992).

[REDACTED] was exposed to thermal and mechanical stress.
No positive reaction was observed during the performance of the test.

From this it is concluded that [REDACTED] is not explosive when exposed to thermal or mechanical stress under the conditions of the test.

PREFACE

Sponsor

Study Monitor

SHERA, Regulatory Affairs

Testing Facility

NOTOX B.V.
Hambakenwetering 7
5231 DD 's-Hertogenbosch
The Netherlands

Study Director

Study Plan

Start : 22 February 2002
Completed : 04 March 2002

TEST SUBSTANCE

Identification

Description

Clear colourless liquid

Batch

1510-14

Purity

See Certificate of Analysis

Test substance storage

In refrigerator in the dark

Stability under storage conditions

Stable

Expiry date

01 January 2003

The sponsor is responsible for all test substance data unless determined by NOTOX.

Note: Don't heat up the test substance above 50°C

Unless it is required for the benefit of the study.

PURPOSE

The purpose of the study is to determine whether or not the test substance presents a danger of explosion when submitted to the effect of a flame (thermal sensitivity) or to impact (sensitivity to mechanical stimuli).

GUIDELINES

The study procedure described in this report is based on the following guideline:

European Economy Community (EEC), EEC-Directive 92/69 EEC, Part A, Methods for the determination of physico-chemical properties, A.14 "Explosive properties", EEC Publication No. L383, December 1992.

ARCHIVING

NOTOX B.V. will archive the following data for at least 10 years: protocol, report, test substance reference sample and raw data. Thereafter, no data will be withdrawn without the sponsor's written consent.

TEST SYSTEM AND RATIONALE

Thermal sensitivity:

Steel tubes made by drawing sheet steel, with an internal diameter of 24 mm, a length of 75 mm and a wall thickness of 0.5 mm were used. The tubes are supplied by Julius Peters and the quality is controlled by the Bundesanstalt für Materialprüfung BAM, both in Berlin (FRG). The open end of the test-tube was provided during the test with a pressure resistant, circular nozzle plate with a central hole. This plate was firmly secured to the top of the tube with the aid of a two-part screw joint. The nozzle plate is 6 mm thick and made from heat-resistant chrome steel).

Mechanical sensitivity by shock:

A gravity fallhammer apparatus, consisting of a cast steel block with foot and anvil, column, guides, drop weight and a release mechanism (according to the specifications of the Bundesanstalt für Materialprüfung (BAM) in Berlin (FRG), Explosivstoffe Vol. 6 (1958) pp. 178-189, 202-214, and 223-235) was used.

Mechanical sensitivity by friction:

Not applicable because [REDACTED] is a liquid.

Rationale:

Recognized by the international guidelines as recommended test system (EEC).

VALIDATION OF THE TEST SYSTEM

The temperature increase during the thermal sensitivity test is validated periodically, using dibutyl phthalate and a calibrated thermocouple. The results are in accordance with the criteria of the EEC-Directive.

PREPARATIONS BEFORE THE TEST

Thermal sensitivity:

The test substance was filled into the tube to a height of 60 mm (the amount of test substance varied between 29.66 g and 30.73 g).

Mechanical sensitivity by shock:

Approximately 40 µl test substance was pipetted in a die device consisting of two coaxial steel cylinders, one above the other and a hollow steel cylinder as the guiding ring (All specifications according to standards of BAM).

The upper steel cylinder was pressed down until it was at a distance of approximately 1 mm from the lower cylinder and was held in this position.

PERFORMANCE OF THE TEST

Preliminary test:

The preliminary test was not performed.

Main study

Thermal sensitivity:

The test tube was heated using industrial quality propane delivered through a calibrated pressure controller (5866; Brooks Instrument B.V., The Netherlands), the pressure was set to be 70 mbar. The gas flow was measured by means of a calibrated thermal mass flow controller (5850E; Brooks Instrument B.V., The Netherlands). The gas was distributed by a manifold to four burners. The four burners consumed 3.0 l of the propane per minute. The construction of the burners is as specified in the directive.

Two series of three tests were performed, the first series using a nozzle-plate with a hole of 6 mm diameter, the second using a hole of 2 mm diameter.

Submission of the test substance to thermal stress was terminated after 300 s.

Mechanical sensitivity:

In the specified impact apparatus, six tests were performed dropping a 10 kg mass from 0.4 m.

DATA HANDLING

Thermal sensitivity:

The test substance is concluded to be explosive when in one of the tests, the test tube burst into three or more fragments.

Mechanical sensitivity:

The test substance is concluded to be explosive when in one of the six tests, the test substance shows a vigorous reaction (i.e. bursting into flames, crepitation or reports).

RESULTS

Thermal sensitivity:

A summary of the observations is outlined in Table 1, the results are outlined in Table 2.

Exposing the test substance for 300 s to thermal stress did not result in an explosion. None of the test tubes showed a deformation.

Therefore, it was concluded that the test substance is not explosive when exposed to thermal stress.

Mechanical sensitivity by shock:

A summary of the results is given in Table 3.

Exposing the test substance to mechanical stress by shock, did not result in any visual changes in the test substance consistency. No traces of a vigorous reaction were observed.

From this it was concluded that the test substance does not react under mechanical stress by shock and therefore has not to be seen as explosive.

In conclusion, [REDACTED] is not explosive when exposed to thermal or mechanical stress under the conditions of the test.

Table 1 Summary of observations during the submission of [REDACTED] to thermal stress.

Diameter of orifice (mm)	Time till reaction (s) ¹	Observations
6	33	flames
	41	release of gases and increasing flames
	120	decreasing flames
	130	flames extinguished
6	34	flames
	41	release of gases and increasing flames
	110	decreasing flames
	140	flames extinguished
6	30	flames
	37	release of gases and increasing flames
	120	decreasing flames
	155	flames extinguished
2	24	flames
	27	increasing flames
	32	release of gases
	86	decreasing flames
	140	flames extinguished
2	26	flames
	28	increasing flames
	33	release of gases
	107	decreasing flames
	150	flames extinguished
2	25	flames
	27	increasing flames
	36	release of gases
	104	decreasing flames
	135	flames extinguished

¹ Total heating time 300 seconds

Table 2 Summary of the results of the exposure of [REDACTED] to thermal stress.

Test no	orifice of the nozzle plate	reaction	explosion
1	6 mm	--	no
2	6 mm	--	no
3	6 mm	--	no
4	2 mm	--	no
5	2 mm	--	no
6	2 mm	--	no

Table 3 Summary of the results of the exposure of [REDACTED] to mechanical stress (shock)

Test no	reaction	explosion
1	--	no
2	--	no
3	--	no
4	--	no
5	--	no
6	--	no

CERTIFICATE OF ANALYSIS

Certificate of AnalysisTNA-2001007
page 1 of 2

ICS-331

Product name :
Chemical name :
Batch number : 1510-14

Test results:

Method	Analysis of	Unit	Result **
Jo/72.11,	See page 2 for a specification		
J20010792			
	e	% m/m	2.0 (± 0.3)
Amp/88.9		% m/m	2.6 (± 0.3)
J20010792	Unidentified impurities	% m/m	0.5 (± 0.2)

** bracketed values are estimated 95% confidence intervals


File code : TNA-2001007

Analytical documentation : 20010792

Authorized byName :
Analytical Research Department

Date : October 25, 2001

Signature :



[REDACTED]

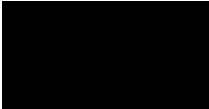
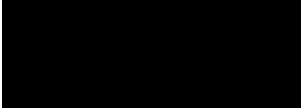
[REDACTED]

Certificate of Analysis

[REDACTED]

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[REDACTED]

structure	% m/m
<div></div> <div>(Type IV) IUPAC : [REDACTED]</div>	18.6
<div></div> <div>(Type III) IUPAC : [REDACTED]</div>	7.9
[REDACTED]	2.1

[REDACTED]
